PUBLIC HEALTH SURVEY OF ECUADOR

Abstract of a Report by Dr. VERNON W. FOSTER
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PART I

GENERAL CONDITIONS AFFECTING HEALTH

Climate.—Ecuador presents the curious situation of a tropical country with the majority of its population living in the temperate areas of the Sierra at more than 7,000 feet above sea level. Most of its cities are located on the central plateau, which lies between 9,000 and 10,000 feet, with occasional bisecting valleys which descend to a much lower level.

Population.—January, 1941, estimates of population for Ecuador give 3,010,245 for the country as a whole (urban 1,028,700, rural 1,760,654, density, 4.47 per square mile). The population by provinces was estimated at: Carchi, 74,855 (density 20.9); Imbabura, 143,774 (29.93); Pichincha, 299,738 (17.88); Cotopaxi, 193,496 (41.94); Tungurahua, 201,492 (62.89); Chimborazo, 252,525 (40.99); Bolivar, 98,077 (30.49); Cañar, 118,830 (44.39); Azuay, 249,733 (22.02); Loja, 193,162 (6.68); El Oro, 78,362 (10.52); Guayas, 401,482 (18.88); Los Rios, 125,008 (21.05); Manabi, 304,412 (16.09); Esmeraldas, 54,408 (3.42); Oriente, 218,735 (0.42); and Galapagos, 2,156 (0.27). Figures for some of the principal cities are: Quito, 180,000; Guayaquil, 160,000; Cuenca, 48,000; Riobamba, 30,000; Ambato, 23,000; Tulcan, 9,000; Ibarra, 9,000; and Otalvo, 5,000. There are about two million Indians in the country.

Area.—Country, 672,860 square miles; Carchi, 3,582; Imbabura, 4,803; Pichincha, 16,768; Cotopaxi, 6,141; Tungurahua, 3,204; Chimborazo, 6,161; Bolivar, 3,216; Cañar, 2,677; Azuay, 7,799; Loja, 28,900; El Oro, 7,451; Guayas, 21,259; Los Rios, 5,937; Manabi, 18,923; Esmeraldas, 15,886; Oriente, 513,836; and Galapagos, 7,844.

Food production and consumption.—Ecuador consumes between 50,000,000 and 65,000,000 pounds of meat per year (based on slaughter figures of 150,000 head of cattle at 300 lbs. each, 100,000 head of pigs at 100 lbs., and 80,000 head of sheep at 30 lbs., plus 25% for animals killed at home). The 1941 livestock census reported 59,800 asses, 1,115,000 cattle, 321,850 goats, 144,390 hogs, 83,920 horses, 29,930 mules, and 1,447,240 sheep. Storage facilities for meat are inadequate. The total production of milk and butter for 1942 was reported as 37,009,969 liters and 501,112 lbs. respectively. There are 23 main cheese plants, 76 butter production centers, and a powdered milk plant (Guaytacama). There is little control of milk or milk products in the country as a whole. However, there is a pasteurization plant in Guayaquil, which occasionally suspends operations. Distribution is by cart, truck, or boat, in large unsealed containers; in Quito, a tank cart; in Guayaquil some bottles are used.
Vegetables and grains produced in Ecuador include avocado (aguacate), beans, beets, cabbage, sweet potato (cassava), corn, carrots, cucumbers, lentils, lettuce, Irish potatoes, onions, peanuts, radishes, rice, rye, spinach, squash, sugar cane, tomatoes, turnips, wheat, cassava (yuca) and others. Among the fruits are oranges, lemons, limes, papaya, chirimoya (Anona humboldtiana), bananas, naranjilla, pineapples, guava (guaba), tixo, melons, and a limited supply of apples, pears, prunes, plums, cherries, peaches, strawberries, figs, grapes, and quince. An attempt to introduce modern agricultural methods of cultivation and production is being made by the Ecuadorian Development Corporation and the Ministry of Agriculture. There are experiment stations at Ambato, Quevedo, and El Oro. Transportation and handling are still accompanied by considerable waste, and there is a lack of proper sanitary control. Available production figures for certain products are shown in Table 1.

Table 1.—Production, Importation, and Export of Certain Food Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Yearly average production, 1939-41</th>
<th>Yearly average importation, 1938-41</th>
<th>Annual export average, 1938-41</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>671,702 quintals of 101 lbs</td>
<td>27 gross kg</td>
<td>80,508 gross kg</td>
</tr>
<tr>
<td>Wheat flour*</td>
<td>855,433</td>
<td>11,762,565 legal kg</td>
<td>194,643</td>
</tr>
<tr>
<td>Barley</td>
<td>309 &quot; &quot; &quot; &quot;</td>
<td>43 gross kg</td>
<td>105,859 &quot; &quot; &quot; &quot;</td>
</tr>
<tr>
<td>Corn</td>
<td>1,155,021 &quot; &quot; &quot; &quot;</td>
<td>630 &quot; &quot; &quot;</td>
<td>354,503 &quot; &quot; &quot; &quot;</td>
</tr>
<tr>
<td>Corn flour</td>
<td>1,354,373 &quot; &quot; &quot; &quot;</td>
<td>17 &quot; &quot;</td>
<td>183,770 &quot; &quot; &quot; &quot;</td>
</tr>
<tr>
<td>Potatoes</td>
<td>1,020,151 &quot; &quot; &quot; &quot;</td>
<td>5,670 &quot; &quot;</td>
<td>15,612,989 &quot; &quot; &quot; &quot;</td>
</tr>
<tr>
<td>Rice</td>
<td>104,905 &quot; &quot; &quot; &quot;</td>
<td></td>
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</tr>
</tbody>
</table>

* Flour may be safely stored for six months on the coast, and indefinitely in the Sierra.

Beer, carbonated waters, and carbonated waters with flavoring are produced in Ecuador, and most of them are safe from a sanitary standpoint, although some smaller producers are careless in this regard. Carbonated water is from natural sources, bottled by machine. Guayaquil beer is pasteurized and bottled by machine; cola drinks are boiled and then bottled by machine.

There is a superficial control of food handlers and restaurants in the main cities. Cold storage facilities are inadequate, although this problem is less important in the Sierra, where the temperature varies from 40 to 60 F. Ice is manufactured in all large cities, from raw, occasionally chlorinated, water, and distributed in trucks, carts, or on the backs of Indians. Dry ice is produced in quantity at Machachi.

**WATER SUPPLIES**

**Quito.**—Source, river and infiltration galleries; wells are under construction. Amount, 10,000,000 to 20,000,000 liters per day, inadequate (the new project will give sufficient water for the present population); storage, in metal and concrete tanks on hills above city; treatment, sedimentation and slow sand filtration of river source, uncontrolled chlorination (two years' reserve of chlorine on hand); distribution, inadequate network in need of repair; new system under consideration; prevalence of water-borne diseases for year ending December, 1942, typhoid, 192 cases, paratyphoid, 59.

**Guayaquil.**—Source, mountain streams 92 km. from city, piped through 22 and 11 inch iron pipes, 22,000,000 liters daily, an inadequate amount; a new project to secure river water from 20 km. away is under
way and will furnish a sufficient supply; storage, in two iron tanks (15,000 and 28,000 cubic meters) on hill above city; treatment, slow sand filtration and chlorination near source, re-chlorination at distribution (no reserve of chlorine at present, although a two-year supply is on order); distribution through a radial network. Water-borne diseases in Guayaquil, year ending April, 1942, typhoid, 153 to 250 cases, paratyphoid, 9 cases, bacillary dysentery, 37 cases.

Cuenca.—Source, river, 4,500,000 liters daily, stored in concrete tanks above city; treatment, slow sand filters under construction; distribution, radial, in need of repair; water-borne diseases, year ending May 31, 1943, typhoid, 211 cases, paratyphoid, 1, dysentery, 228.

Riobamba.—Source, mountain spring 18 km. away, 10,000,000 liters per day; storage in well covered iron tanks 140 meters above city, capacity 484,000 liters; treatment, none, source is well covered and protected and water conveyed in concrete and steel piping offering little chance of contamination; distribution, radial, no meters; prevalence of water-borne diseases: only sporadic cases of typhoid and paratyphoid.

Ambato.—Source, springs six km. from city, 9,000,000 liters daily, conducted in 6 inch iron pipes to well covered concrete tanks 75 meters above city; no treatment; radial distribution; only sporadic cases of typhoid and paratyphoid; typhoid is epidemic in the rainy season, but probably not carried by the water system.

Tulcan.—Source, river, 675,000 liters daily, stored in two metal tanks with a capacity of 436 cubic meters; treatment none, filtration is planned; distribution, network in fair condition; water-borne diseases, sporadic cases of typhoid.

Ibarra.—Source, mountain spring 2 km. from city, 2,000,000 liters per day, stored in well covered concrete tank above city; no treatment; distribution, radial network needing repair; water-borne diseases, sporadic cases of typhoid.

Otalvo.—Source, mountain springs 2 km. from city, intake well protected and covered by concrete building; amount, 3,500,000 liters daily, piped to the city in 40 cm. cement pipe; storage, in concrete tank above city; no treatment; distribution, excellent radial network; water-borne diseases, very rarely a case of typhoid.

SEWAGE

The main cities of Ecuador have between 50 and 90% of their area served by sewers, usually a combined water-borne sewer system with master collectors, emptying without treatment of the sewage into rivers below the city. House connections may run as low as 30% in some places, and cannot be improved at present because of the difficulty in obtaining materials. In a few localities sewage is used for irrigation of vegetable gardens and orchards, and in fewer still, human excrement is used as fertilizer.
Insects, animals, and plants of medical importance to man.—Mosquitoes found in Ecuador include Anopheles (tarsimaculatus, pseudopunctipennis, punctimacula or mediopunctatus, hylephilus, albimanus), Culex (quinquefasciatus, coronator, conspiurator, pilosus), and Aedes (taenorrhynchus, aegypti), potential transmitters of malaria, yellow fever, encephalitis, filariasis, and dengue.

lice include Pediculus capitis, pubis, and corporis; ticks, Ixodes ricinus, Amblyomma cajannense, etc.; flies, Musca domestica, Dermatobia cyaniventris, and Lucilia hominovorax (deposit larvae in humans, producing abscesses), Chrysops discalis, Phlebotomus papatasi (sand fly, vector of bartonellosis), and gnats; flies, Pulex irritans, Ctenocephalus canis, Xenopsylla cheopis, Sarcoptes (Tunga) penetrans (jigger), Hectopsylla suarezi, Ceratophyllus londinensis, etc.; bedbugs and sucking bugs, Cimex lectularius, C. rotundatus, Triatoma dimidiata and T. carrioni; ants, Odontomachus, Atta, Holocentrus whymeri—there are more than 40 species, some poisonous; and roaches in great variety.

Dangers animals.—These include the puma, jaguar, bear, and wild cat.

Poisonous plants and fruits.—Plants: Echites hirtiflora, Thevetia nereifolia, Plumeria, Hippomane mancinella, Strychnos toxifera (curare), Banisteria caapi, Solanum melancheoticum, Cucuta virosa, Datura stramonium, D. arborea, D. sanguinea; barbasco (source of rotenone) such as Lonchocarpus utilis; Apurimacia iccheli, Gliricidia leucorrhiza, Piscidia cartagenesis, Tephrosia cinerea, T. glandulifera, Chibidiunum sylvestre, C. surinamense, Phyllanthus amarus, Jacquinia apruci, J. armillaris, Mabo psidioides; fruits, Coraltia thymifolia (Shanshi), Solanum caripense (chimbalo); plants producing contact dermatitis, Lithraea caustica, Hypomane manicinella, Rhus juglandifolia (arachacapai).

Poisonous or dangerous snakes.—The sea snake, Pelamysus platirus; the coral snakes, Micrurus filiformis, M. lemniscatus, M. mitarititus, M. ornateissimus, M. transandinus; Leptomacurus mardelli; the bushmaster or Equis Lachesis muta; and the vipers, Bothrops atrox, B. castelnaudi, B. monticellii, B. nasuta, B. schlegelli, B. xanthogrammus, B. lanceolatus, B. microphthalmsus, B. pulcher. Various common names for snakes include: rabihueso, motolo, orito-machacuy, jahuarzhin, puzhlo, pumapalo, sinachapalo, palanda, podridora, zura, labaria, anaconda, boa.

Poisonous or dangerous fish.—Sharks, rays, octopus; arachnids: mygale, buthus, ananteris, centrurus, tityus, hadruurus, hadruroides, chactas, heterochactas, teuthraustes, Scolopendra subspinipes, Sc. caripenis, Sc. galapagoensis.

MEDICAL FACILITIES

Hospitals and clinics.—Ecuador has about 75 hospitals with nearly 5,000 beds, including about 65 general hospitals, three maternities, one surgical and maternity, one surgical, three children’s, and one tuberculosis hospital. A new tuberculosis sanatorium is planned for Guayaquil.1

Physicians and other professionals.—There are between 600 and 700 licensed physicians in Ecuador, over half of them in Quito and Guayaquil; some 20 are European refugees; there are 160 dentists, 100 midwives (often with little training), and very few nurses and laboratory technicians. The new nursing school is expected to furnish the country with 20 to 25 trained nurses a year beginning with the graduation of the present class in 1945.

(To be continued)

1 The complete data furnished by Dr. Foster on hospitals is in the files of the Bureau.